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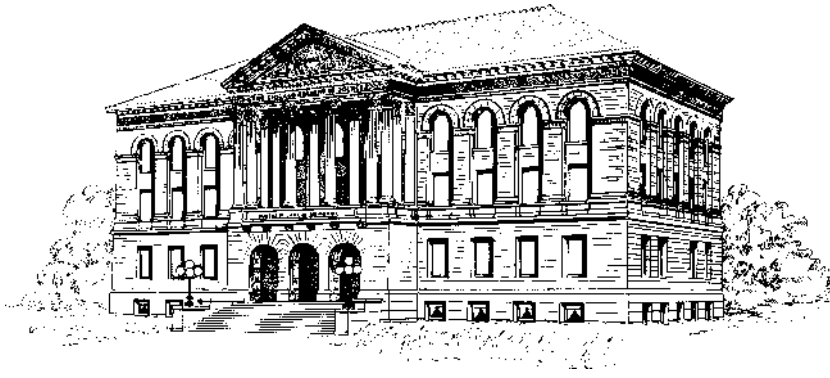

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Rain forest on Mt. Ovando.

Snakes, Frogs and Bromelias

HOBART M. SMITH

With photographs by Rozella Smith

Bromelias are curious, pineapple-like plants that are usually found in trees. There are many species. Some are huge things, weighing twenty or thirty pounds and having a total spread of about five square feet. There are medium-sized species, some with many leaves arising in a perfect arc from a central stem, others with fewer, stouter leaves that recurve a short distance from the base, and together form an urn-shaped plant of great beauty and grace. There are tiny, vase-shaped species, and peculiarly modified ones with very narrow, spiral leaves. Like the century plants to which they are related, they flower just once, producing a long, central stalk with many flowers. In some species the flowers are bright red, and can be seen from a great distance, even before it is possible to decipher that it is actually a bromelia that bears the red flag. After blooming the plant declines rapidly, becomes brown and shortly dies.

Although bromelias are generally arboreal, they are sometimes found on rock fences and ledges, fallen logs, or on the ground in fact, anywhere that there is suitable decaying matter. Usually a species is restricted to a particular habitat; some live only on trees in moist areas, some only on oaks, and others only on the ground. Tree-living species will not live On the ground; if they fall, when a rotten limb breaks, they soon die. They do not always grow on rotten trees, or decaying limbs; their roots frequently grow into the bark of a vertical, living trunk. Some species form clusters; the seeds falling into the debris of the decaying parent plant, grow and produce more seeds and more matrix, eventually forming a massive cluster. Frequently the weight becomes greater than the limb or the bark can bear, and the prolific tendency of the plant defeats its purpose, for all bromelias die when they fall to the ground.

The leaves of all except the aberrant varieties are specially adapted for catching and retaining water in their axils. This aids them in their precarious existence during the dry season, for the majority of these plants live in or near the tropics, where periods of heavy rain alternate with long periods of total drouth. After they bloom and die, the brown, warped leaves no longer retain water for any length of time.

The study of these plants should be very interesting, although difficult because of their bulkiness and the great length Of time required for them to bloom—twenty years for some species. The lives of many

of these plants are cut short, their purpose unfulfilled, by bromelia collectors and collectors of other plants and small animals. As far as we are concerned, we have been more interested in the animals they shelter than in the bromelias themselves.

The amount of animal life associated with one of the huge clusters never fails to astound us. In addition to the birds, rats and mice that frequently nest in them, we have also found a tiny species of opossum *(Marmosa).* Lizards and snakes take refuge there, frequently seeking food in the form of salamanders, frogs, and insects that are sometimes plentiful. Spiders, centipedes, millipedes and many species of insects are abundant, and at times, high in the arboreal bromelias, even earthworms are found. We always wondered how the earthworms manage

One of the bromelia salamanders from Palenque.

to climb the trees. When one stops to consider the possible extent of the microscopic fauna and flora of these clusters, the complexity of life in such communities becomes almost inconceivable. Truly here is a highly intricate animal and plant association that would well repay intensive study, and which would certainly be worthy of a doctoral dissertation in any institution.

Of this large assortment of animals, the only ones in which we were especially interested were the reptiles and amphibians. In actual numbers of specimens found, salamanders top the list, with frogs second; but frogs occurred in more plants than did salamanders. As a rule only one frog was found in a single bromelia, while salamanders were frequently there in numbers—my wife set our record with 38 from a single plant. Third on our list, both in abundance and in frequency of occurrence, are snakes. The lizards come last, for they are seldom

found. Some day perhaps we will find a stray turtle or crocodile hidden in a clump of terrestrial bromelias, and then they, too, can be added to the list—a little furtively.

Often frogs and salamanders occur in the same plant, but rarely were snakes found with salamanders, and never with frogs, which form a delectable portion of almost any snake's diet.

The largest species of salamander was an ornately marked one *(Oedipus platydactylus),* usually about six inches long but occasionally measuring over eight inches. These are gray below and yellow to reddish-orange above, while the sides are jet black. Most conspicuous are their big, flat, fully webbed feet. The hind legs and feet are about twice as large as the front. These animals move slowly and sedately, lifting their limbs with seeming care, the great flaring feet displayed fully as they are solemnly placed down heel first, the edges clasping the surface a moment later. There is a smaller, very common species *(Oedipus rufescens)* of the same flat-footed group which is only an inch and a half to two inches long, and rather dully colored, but it has the same curious manner of walking. We hope that sometime we will discover a new species, for we have saved a special name for it—*floogiensis.* Or perhaps it would be nice to name it for one of our policeman friends.

East of the first foothills that herald the mountains of the edge of the plateau west of Veracruz, a flat, dry plain stretches toward the sea. The coastal region is very damp, much of it covered by marshes and swamps, but away from the immediate vicinity of the ocean, between the swamps and the hills, stretches this amazingly dry, desolate plain. Short, scrubby trees are scattered here and there, and wherever a stream meanders the brush becomes almost impenetrable. During the dry season it is extraordinarily hot. Even seasoned Mexicans get headaches after spending a day working in the region. Here both the large, urn-shaped species of bromelia and the still larger, spread-leaf variety occur. We made frequent trips to this area, at several places, and soon learned not to bother with the spread-leaf species. At first we looked in them, as well as in the urn-shaped one, although less frequently because they are scarcer, but we got nothing for our trouble. Yet back in the heavily wooded, moist hills around Córdoba, the same type of plant almost always contained some of the little flat-footed salamanders. The urn-shaped bromelia, however, gave us the best hunting we have ever found in these plants in Mexico. So productive were they that when we happened to come upon them in other parts of the country we always rejoiced with anticipation of good hunting.

An urn-shaped type of bromelia near Palenque, Chiapas.

Occasionally we found tree frogs. A tiny, striped, gray one *(Hyla staufferi)* was very alert and jumped so quickly upon being uncovered that we secured a series with difficulty. There was a large, gray species with a roughly X-shaped mark on the back *(Hyla baudinii),* which is common from Texas to Central America. Most common of all was a large, light tan species *(Hyla venulosa)* with varied, lighter markings, and a warty skin, like that of a toad, but it is as moist and slippery as any other frog. When picked up, these frogs invariably secreted a white, viscous substance that quickly came off on our hands and dried. Our relation with them did not end as they were placed in the bag, for the secretion on our hands, finding its way after a time to our nostrils, caused a violent catarrh lasting four or five hours. Some of the men with us became so sensitive to these secretions that they began to sneeze as soon as they came within a few feet of the frogs. This peculiar, poisonous characteristic accounts for the fact that our collection contains few of the offending species, even though we found many of them. Not only did the frogs themselves make our lives miserable, while we collected and carried them in the field, but the very sacks in which they were carried could not be used again for several days without causing violent sneezing and much blowing of the nose.

The bromelias which had not yet bloomed were always green and contained at least a certain quantity of moisture. We always found amphibians in these, but never snakes. While we were fairly certain

that snakes at times hunted through the green plants for frogs and salamanders to eat, they seemed to dislike moisture and always retired to the dead, dry plants that had already bloomed. The dead plants do not hold water and are completely dry. So invariable was the association of amphibians with live, green bromelias, and snakes with dead ones that we could tell in advance what we *might* get from the plant we were pulling down.

Although the strong probability of finding snakes made them worth investigating, the dead bromelias gave us more trouble than the green ones. Not only were they difficult to tear apart and look into—always catching our hands or arms on the big, recurved hooks at the edges of the leaves—but the snakes were not alone in preferring such a habitat. Myriads of large ants, spiders, centipedes and scorpions also took refuge in these dry plants. All were routed and with good reason angered as we tore apart their homes, so that we spent most of our time dancing about as though on hot stones, to keep the vermin from crawling up our legs. We took such measures as we could to keep them out of our clothing, but in spite of all our precautions, even to wearing gloves, some ant would penetrate our defenses occasionally and sting or bite us most painfully. A half to three quarters of an inch long, these tropical ants are nothing to laugh at. Some can sting as well as bite. There are dull black, long-headed ones that nervously scuttle about and sting with terrible force. There is also a big, hairy, golden-headed species that only bites, but its powerful jaws can penetrate the skin two or three times before one becomes aware of the pain caused by the first bite. These are the worst of all, for they seem to inject some substance that causes still more pain. A finger bitten by one of them will ache for two days or more.

Accordingly, we did our bromelia hunting with our eyes wide, and senses alert. We had to. It was constantly necessary to ward off ants swarming on the ground and up the plants we were tearing apart, and be ready all the while to grab a leaping frog, a wriggling salamander, a writhing snake, or to flick aside a scampering scorpion clanking in his heavy armor over the rattling leaves. We were glad, however, that we had no worse experiences than ant bites, headaches, and "frog catarrh."

Most of the snakes found in bromelias were of arboreal or semi-arboreal kinds. Among the more common species were the night snakes *(Leptodeira)* and the nocturnal vine-like snakes *(Imantodes)* with extraordinarily elongate, slender bodies and disproportionately large heads. We think they are the "snakiest" animals we have ever caught. Another was a green, diurnal species *(Leptophis mexicanus)* that was very wary and sometimes ran out of the bromelias before we began to tear them apart. When cornered, they draw back in S-shaped

curves and open the mouth full width. The inside of the mouth is light orange and flares like a warning signal. In this attitude, they are most striking both in action and in color. They are not all bluff, either, for they strike at every hostile movement and between strikes, follow with glaring eyes and wide-open mouths every action beyond striking distance.

That the snakes do not like moisture in their bromelias was proved on several occasions. It is not supposed to rain during the dry season. but sometimes it does. Once or twice we happened to arrive for our collecting on the plains after a rainstorm, and we cursed our luck for all the dead bromelias were wet and not a snake was in them. Unfortu nately the undesirable vermin that haunt the bromelias suffered no dampening of their spirits; at least they did not move out like the snakes.

Amphibians too leave the bromelias after the rains set in. They do not leave with the first shower, however, for that would be fatal in the dry season. They wait until the rains come every day, and all the earth is so damp that not even a frog could get dry. This general exodus from bromelias during the wet season accounts for some of the varying tales of good or bad luck in collecting in these plants. A collector who has only the summer—the rainy season—in which to collect, cannot hope for much from bromelias. Of course, there are some species of frogs which breed in bromelias at higher elevations and are found in them all year around. We discovered one of these just below Orizaba —a little, yellow tree frog *(Hyla dendroscarta)* that lives, lays its eggs, spends its life as a tadpole, all in a small, spineless bromelia. The tadpoles have a relatively small body and a very elongate, thick tail almost without a fin and with it they wriggle about like a worm. Unlike the majority of tadpoles, they do not have to swim.

The bromelia fauna of some regions may vary amazingly at different times of the year. One of our favorite haunts was the mountains at the edge of the plateau, at about 7,000 feet elevation, above Acultzingo on the Tehuacan-Orizaba highway. On the ridges near this pass there are thousands upon thousands of bromelias scattered over all the low trees, some of which are pines and stunted cedars. Our first collecting efforts here yielded numerous specimens of a new tree frog *(Hyla arborscandens* Taylor), which we heard calling on all sides, and one small, green alligator lizard *(Gerrhonotus gramineus).* We found more of these lizards sunning themselves on the outer branches of low, bushy trees, where they glittered in the sun like a setting of polished emeralds. They have conspicuous, orange eyelids and yellow bellies, but are otherwise entirely green. They have a flattened body and a long tail—a build much like an alligator—and a triangular,

Mrs. Smith opens another bromelia.

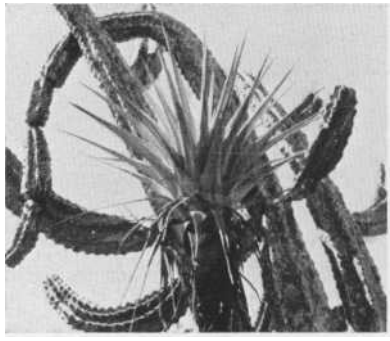
flattened head. They are only about ten inches long, tail and all, but the local people hold them in great fear. So firmly convinced are they that these animals are deadly poisonous that, when we let the lizards bite the fleshy part of the hand (where it hurts less), they gave a peculiar laugh and said "Yes, give us some of your medicine first, and we'll do that, too."

Some time later we returned to the same spot and secured many alligator lizards in the bromelias, where they were hibernating, half covered with ice-cold water. They almost cracked as we took them out and straightened them. We found frogs, too, but in addition to the kind we got before, there were some larger ones, which also proved to represent a new species (now *Hyla forbesi*).

A third trip yielded still different results. We found no alligator lizards, but obtained two species of frogs. Curiously enough, none were of the species we first encountered although there were a few of the second. Almost all were of a green species *(Hyla euphorbiacea)* that was previously known only from the vicinity of the city of Oaxaca.

It is remarkable that we did not find salamanders in those bromelias. In the same area two species occur on the ground, but apparently none live in the bromelias. Perhaps our next trip will yield salamanders and no frogs. Bromelia collecting, we have learned, is erratic.

Once we were collecting on a mountain near Chilpancingo, toward the southern coast of Guerrero. We had climbed a long way that day, up to the crest of a high ridge. Bromelias were abundant and we hopefully tore down hundreds, but not one contained anything but water and debris. The next day we drove up the ridge on the opposite side of the valley. There, too, were bromelias, and half-heartedly we looked into a few. Much to our surprise, we found frogs! They were even moderately abundant and we secured a good series. They, too, were undescribed (now *Hyla melanomma).*



A bromelia on a cactus near Ixtepec, Oaxaca. This plant contained several eggs of a small gecko.

Only one species of lizard, besides the green alligator lizard, was found in bromelias in any abundance. This was a kind of anole *(Anolis pentaprion),* a small, diurnal lizard with a highly-colored throat-fan that can be opened and closed at will. For some strange reason we found only the eggs—small, leathery ovals four or five millimeters long. All were in dead plants, in clusters of four to six. Some bromelias held as many as twenty-five or thirty, in separate clusters. We saved the eggs, and kept them in a covered dish with moist, rotten wood. Nearly all of the hundred or more soon hatched, and the big-headed hatchlings were preserved within a day or two after birth, since we could not find food for them. It was fortunate that the eggs were so nearly ready to hatch, so that at least we got the hatchlings, for we never found the adults. We looked for them most diligently, but without success. Not until we returned to the museum did we learn that the species that lays its eggs in the bromelias is a medium-sized one, about six or seven inches long, tail and all; and someone else had already observed that during the dry season (which was when we collected) the adults could rarely be found.

In just one other place, on the Pacific coast side of the Isthmus of

Tehuantepec, did we find lizard eggs in bromelias. These we recognized from earlier acquaintance. They belonged to a tiny species of gecko *(Sphaerodactylus glaucus)* that is very common in the houses of many towns of southern Mexico. The adult is only about an inch and a half long, and the eggs are nearly spherical, white and about three millimeters in diameter. Unlike practically all other reptile eggs, which have leathery shells, these have very thin, brittle shells like the eggs of tiny birds.

On Mount Ovando in southern Chiapas, we obtained our greatest quantity of specimens from bromelias. This mountain is 7,000 feet high and On the upper elevations, which are wooded with cedars and pines, are three kinds of bromelias in considerable abundance. The smallest was found all over the area but yielded nothing. The medium-sized species occurred from about 6,000 feet to the top, and the large one from the same elevation to about 6,700 feet. Two kinds of salamanders, one very small and the other medium-sized, were found. The larger species was confined almost exclusively to the large bromelias, while the smaller ones occurred in both the large and medium-sized. Above 6,700 feet, where the large bromelias did not occur, only the small salamander was found. Unhampered by competition with the larger species, it was extraordinarily abundant. A bromelia with only one salamander was considered a "wash-out." Almost all had ten or fifteen, and one had as many as thirty-eight—the record previously mentioned.

With the salamanders we found a peculiar rough-skinned tree frog *(Cauphias),* not related, and fortunately not similar in action, to the other rough-skinned one that caused such grief with catarrh. The males of this one, however, have a flesh-covered spike on each thumb, which can even pierce one's skin. Perhaps more curious than this is the armament of tiny teeth on the upper jaw. This would never have been noticed, except that one which I caught and was holding by the hind legs in my doubled fist, pulled on my wrist with its sticky toes and then, not getting anywhere, put its head down and tugged by catching its little upper teeth in my skin! The teeth were so small, of course, that although they scratched a little they did not penetrate the skin.

We were lucky on this mountain for we were there in late April, a little over a week before the rains began early in May. Although we did not care to struggle up the 7,000 foot slope again to prove it, we are willing to bet that had we waited until May, we would have found no salamanders nor anything else in the bromelias of Mt. Ovando. We know of another herpetologist who collected on the same mountain during the rainy season, and who was most emphatic about the complete absence of salamanders from bromelias!

The Developmental History of Radio

HENRY C. CREW

An address delivered by Colonel Robert R. McCormick over W.G.N. and the Mutual Broadcasting System, March 22, 1941

Thanks to Dr. Henry C. Crew, Professor Emeritus of Physics at Northwestern University, and a member of the National Academy of Sciences. I speak tonight on the developmental history of radio.

It is a curious fact that recent achievements in wireless communication are much more familiar to the American people than are the few fundamental discoveries which have made radio possible. The impression is widespread—even among our *intelligentsia*—that communication by means of electromagnetic waves dates from that cold winter night in 1901 when the late Senatore Marconi, waiting at St. Johns, Newfoundland, for a signal from an assistant in England and having no tall antenna at his disposal, sent up a kite which supported a long wire and thus picked up the three short signals which constitute the letter "S."

This achievement strained the credulity of the world; but it was not the beginning of wireless. To begin at the start, one must go back some two hundred years, to 1747 when d'Alembert, the well known French encyclopaedist, succeeded in solving what is now known as the "equation of wave propagation." Phenomena which are described by this equation, such as the motion of a piano-wire, ripples on the surface of water, the motion of air particles through which sound is passing all these turn out to be some form of wave motion.

The next foundation stone of radio was laid by two men early in the nineteenth century, when they discovered a new phenomenon which later was found to be described by d'Alembert's equation.

This new and remarkable fact, which had escaped the attention of everyone up to 1820, is that every wire carrying an electric current is surrounded by a magnetic field: and its counterpart, discovered eleven years later, is that, by merely moving a wire in the neighborhood of a magnet, one can produce an electric current in that wire. This phenomenon of electromagnetism, in its first form, was discovered by the Danish physicist, Oersted, at Copenhagen; but, in its second form, it was first found by Faraday at London.

The third great step was taken by a brilliant young Scotsman, Clerk Maxwell, when only 33 years of age. Maxwell announced to the Royal Society of London in 1864 that, having described the results of Oersted and Faraday mathematically, he found the equation to be exactly of the kind which d'Alembert had interpreted to mean wave

motion, and, more than this, he showed that electromagnetic disturbances must travel with the speed of light.

All this was accomplished in 1864, within the period of our Civil War. This young Scotsman also proved that these waves are reflected, refracted and polarized precisely as ordinary light is. Maxwell moreover pointed out that, when one has an alternating current in a wire, it sends out an alternating magnetic field also an alternating electric field; and since the form of the equation is identical with that of d'Alembert, Maxwell knew at once that this magnetic field would travel as an electromagnetic wave.

"But if this be true," you ask, "why was not radio-communication already an accomplished fact?"

The answer is that, in 1864, no one knew how to produce these electromagnetic waves. It was not, indeed, until 1888 that the next foundation stone of radio-science was laid. The deliberate production of these waves, in a laboratory, was reserved for a young German, Heinrich Hertz, whose widow and daughter are, at this moment, refugees in Cambridge, England.

It was at Karlsruhe, where he was teaching physics in the engineering school, that Hertz showed just how to produce rapid electric oscillations which are, in turn, a source of electric waves. He showed also how to detect these waves. From that time on—a trifle more than half a century—the growth and perfection of wireless telegraphy has been comparatively simple.

The next foundation stone, laid by a young American who fortunately is still with us, Lee DeForest, of New York City, is one whose importance it is difficult to overestimate. Because, it is one of the two stones which enabled us to step up from the wireless telegraph to the wireless telephone. This fifth stone consists of DeForest's invention of the three-electrode tube in 1907.

Another use of the three-electrode tube was discovered by E. H. Armstrong who, in 1914, showed how this vacuum tube may be employed as a source of sustained oscillations, that is, a train of waves of constant amplitude, what is now called the "carrier wave." It is not surprising therefore that in the following year, 1915, the human voice was heard across the Atlantic for the first time.

Seeing how modern radio-communication has developed out of these six fundamental discoveries, one wonders whether the old Spanish proverb in praise of "old wood to burn, old wine to drink, old friends to trust and old books to read" ought not to be extended so as to include *old knowledge*. For, the only reason Maxwell and Hertz happened to discover electromagnetic waves is that they were perfectly familiar with the work of Oersted and Faraday and had a thorough understanding of d'Alembert's wave-equation.

Bird Banding

LOUIS G. FLENTGE

Bird banding in America was first accomplished by Audubon, who, in 1803, tied silver threads around the legs of young phoebes and was rewarded the following season by having two of the marked birds return to nest in the same vicinity.

In the following years, investigators marked birds in many ways but none seemed to be as suitable as the placing of an aluminum band around the tarsus. Various mutilations of feathers, feet, or bill, as well as the staving or dyeing of flight feathers were attempted, but did not prove satisfactory. In 1909, the American Bird Banding Association was organized in New York City. Banding work was carried on by this organization until it outgrew its resources and, in January, 1920, was taken over by the United States Bureau of Biological Survey noW the Fish and Wildlife Service of the Department of the Interior.

The banding of fledglings as well as systematic trapping and banding of adult birds is now carried on throughout the United States by about 2,300 volunteer cooperators who band approximately 450,000 birds each year. Over 3,500,000 birds have been handed in the twenty years in which banding has been under the direction of the Survey.

The banding of birds is of definite scientific value. Great volumes of information relative to the life histories of our American birds are garnered from the reports of the bird banders. Such data as the lines of migration of individual species of birds, as well as the speed of travel, distribution, length of life, and homing instinct, are readily available from banding records. The seasonal distribution of game birds presents a real problem for law-making bodies in the establishment of game laws. Reports submitted by bird handers are of great value in the limitation of hunting seasons and size of bag.

Traps of every description are employed in bird handing work; from the drop trap which is nothing more than a variation of a box propped up on a stick with a cord running to the watcher, to delicate contrivances designed to lure the tiny warblers out of the treetops as they pass through in migration. At least a few individuals of each species are banded nearly every year, while some species are banded in large numbers. In the fiscal year, ended June 30, 1939, chimney swifts headed the list with 71,623 banded individuals. Cooperators in the Chicago Region band many birds each year, and many of them return to the place of banding year after year. Others never return to the banding station and may be taken in one of the neighboring states, in Canada, Mexico or Central America.

There are many interesting records of birds banded in this area that have been recaptured, shot, or found dead at some later date. The large number of interesting recoveries would fill several volumes; therefore, it is impossible to mention here more than just a few.

Ruddy turnstone (A217098) banded at Zion, Illinois, September 4, 1929; shot at Bayou Scofield, Louisiana, October 10, 1929.

Spotted sandpiper (A134132) banded at Zion, Illinois, August 23, 1929; found and released at Raleigh, North Carolina, September 27, 1929.

Blue jay (A346309) banded at Hubbard Woods, Illinois, May 13, 1930; found dead February 24, 1931, at Bluevale, Huron County, Ontario.

Bohemian waxwing (B153871) banded March 25, 1932, at Waukegan, Illinois ; captured April 25, 1932, at Craik, Saskatchewan.

Starling (38-218285) banded at Chicago, Illinois, February 13, 1938; retaken at the place of banding January 29, 1939. It was shipped by express to Hillsdale, Indiana, and released there on January 30, 1939. It was again retaken at Chicago, Illinois, on March 5, 1939, having returned from Hillsdale to its favorite roost.

Starling (38-218376) banded at Chicago, Illinois, February 13, 1938; retaken at the place of banding January 29, 1939. It was reported again from Dallas, Texas, December 28, 1939.

Chimney swift (37-91971) banded at Highland Park, Illinois, August 20, 1939; retrapped at Clarksville, Tennessee, on August 27, 1939. This bird covered an airline distance of 385 miles in seven days.

Any person who finds a banded bird is urged to notify the Fish and Wildlife Service, U. S. Department of the Interior, Washington, D. C. If the bird is dead, the band should be removed and sent along with any available information such as the date found, cause of death, species and locality. If the bird is captured alive, the band number should be noted along with whatever information is available and a note sent to the Department. Never remove the band from a live bird. Simply record the number very carefully and release the bird at once. Another record may come from this bird that will result in data of scientific importance. Anyone reporting a bird to the Department will be notified of the time and place of banding. The bird-banding cooperators and the Fish and Wildlife Service sincerely appreciate the interest and helpfulness of persons who send in accurate reports.

Have You Seen A Ghost-Flower?

CONSTANCE NICE

Walking in the shady summer woods, you may come upon a clump of small plants which seem to have been modelled in white wax. From each stem, which is only from four to eight inches high, hangs a bell-like flower. It is the Indian Pipe, also called Ice-plant, Corpse-plant or Ghost-flower.

Closer examination shows that these plants have not only dispensed with green coloration, but reduced their leaves to mere scales. It is clear that they are not equipped, like ordinary plants, to manufacture their food with the aid of sunlight, but have another method of making a living. The Indian Pipe is not, like the dodder, parasitic on flowering plants but saprophytic, living on decaying vegetation. It is not, however, able to draw its nourishment directly from leaf mold, but must depend on the food predigested for it by a species of fungus which inhabits its roots.

Mr. John N. Porter, in his article "Without Green Leaves" in the June, 1939, *New England Naturalist,* explains the mechanism of this

relationship, which commonly occurs between fungi and most of the higher plants. "Direct connections are established with the soil through the strands of the fungus which enter the root of the saprophyte. In many cases the cells are not actually pierced, but the fungus forms a mantle completely surrounding the root and penetrates short distances between the cells."

Many botanists believe that originally the fungus was parasitic on plant roots, but that some plants were able to defend their tissues and even use the food manufactured by the invader. "One might even say that the plant became parasitic on the fungus."

This harmless, though perhaps not very self-reliant habit, drew a great deal of indignation many years ago from Miss Neltje Blanchan. In her *Nature's Garden* she accused the Indian Pipe of being parasitic on higher plants, as well as being saprophytic. "To one who reads the faces of flowers, it stands a branded sinner.... Doubtless its ancestors were industrious, honest creatures, seeking their food in the soil, and digesting it with the help of leaves filled with good green matter (chlorophyll) , on which virtuous plant life depends; but some ancestral knave elected to live by piracy. . . ." As members of a species which also does not manufacture its food by the aid of chlorophyll, perhaps we should not be so harsh with the Indian Pipe.

The whiteness of the Ghost-flower is not due to any white dye, but like the Water Lily's pallor, to the refraction of light by innumerable tiny air cells. Its habit of turning black when bruised is supposed, according to Mr. Schuyler Mathews, to have suggested the rather gruesome name of Corpse-plant.

After the flower has been fertilized by an insect forcing its way to the base of the stigma, it becomes salmon colored and turns upward as its numerous tiny seeds ripen.

The Indian Pipe's close relatives, Sweet Pinesap and False Beechdrops, resemble it except that their flowers are clustered and vary through red and yellow as well as white. Like other members of the Heath family, it requires acid soil. Fragile though it seems, the Indian Pipe's range includes nearly all of North America, and even Japan and the Himalayas. According to H. S. Pepoon's *Flora of the Chicago Region,* the plant is frequent locally in oak woods and common near Grand Calumet, Miller, Indiana. In 1923 a clump was found containing 146 stalks and measuring 14 inches across!

Keep your eyes open on your hikes for the Indian Pipe. It is one of those comforting flowers that cannot be mistaken for anything else.

The Chicago Entomological Society

A BRIEF HISTORY

ALEX K. WYATT

The Chicago Entomological Society was started under rather auspicious conditions on January 22, 1897.A constitution was prepared and organization completed February 6, 1897. The initial membership was as follows:

William Bebb	A. L. Melander
Eliot Blackwelder	S. Miller
Charles T. Brues	Jas. E. McDade
Edwin H. Draper	Arthur J. Snyder
Dr. Joseph Lane Hancock	James Tough
John L. Healy	Oliver. S. Westcott
Camp Kelsey	E. Wildman
W. E. Longley	Alex K. Wyatt

Professor Westcott became the first president; Arthur J. Snyder, vice-president; John L. Healy, secretary; W. E. Longley, treasurer and Dr. Hancock, curator.

The two organization meetings were held in hotel rooms. Thereafter, from February 20, 1897, to October 28, 1898, meetings were held at the photographic studio of L. Melander & Co. at what was then 208 East Ohio Street. It would now be 77 W. Ohio Street. The John Crerar Library then provided facilities for meetings until February, 1907, and possibly later. After that date the records are incomplete.

The Society became affiliated with the Chicago Academy of Sciences as the Entomological Section of the Academy in January, 1903, but continued its meetings at the John Crerar Library. My recollection is that the organization functioned well during 1907 for in December of that year the meeting of the Entomological Society of America was held at the University of Chicago and the local entomologists entertained the visitors at a well attended smoker. Between that year and January, 1913, records are missing and it is probable that attendance fell off and meetings were discontinued, for part of the time at least.

In January, 1913, interest appears to have revived, for minutes of meetings held at homes of various members indicate a satisfactory attendance and considerable activity. These meetings were indepen-

dent of the Academy. They afforded excellent opportunity for the members to inspect each other's collections and refreshments provided by the host were an added attraction.

Starting in January, 1921, meetings were held at the Chicago Academy of Sciences and have continued regularly with the exception of the summer months, when it appears impossible to get members together.

One publication, "Occasional Memoirs of the Chicago Entomological Society" was issued by the Society in March, 1900. It included four articles: Some New Tettigidae from Madagascar" by Dr. Hancock, "A New Species of Gomphus" by James Tough, "Insect Drift on the Shore of Lake Michigan" by James G. Needham, and "The Argynnids of North America" by Arthur J. Snyder.

It happens that the writer is the only one left of the original members, but Emil Beer who joined in April, 1899, William J. Gerhard, February, 1902, and Emil Liljeblad, March, 1903, are still with us. A number of prominent entomologists have been members from time to time, some in their teens before becoming well known. Among these were: Dr. C. C. Adams, Director of the New York State Museum; Dr. John A. Comstock, Associate Director of the Los Angeles Museum; Dr. Joseph Lane Hancock, who died in 1922, was well known for his work on Orthoptera; Dr. William Morton Wheeler, before his death in 1937 was Professor of Entomology at Harvard University and one of the foremost entomologists of the world; Dr. Charles T. Brues, Professor of Entomology at Harvard University; Dr. A. L. Melander, Professor at the College of the City of New York; (both Brues and Melander became acquainted with Professor Wheeler through the meetings of the Chicago Entomological Society and when he went to the University of Texas they followed to study with him there); Dr. S. W. Williston, who died in 1918, was Professor of Palaeontology at the University of Chicago and interested in Diptera and Professor James G. Needham of Cornell University took part in the meetings of the society on a number of occasions but never became a member. In conclusion, I want to recall to memory our good friend John L. Healy, one of our original members, whose extensive collection of Lepidoptera now belongs to the Chicago Academy of Sciences.

Test Your Nature Lore.

I. To what bird or mammal does each of the following names refer?

1. Philomel
2. Chanticleer
3. Bruin
4. Ephraim
5. Grimalkin
6. Dobbin
7. Reynard
8. Towser
9. Whisky Jack
10. The Lord God

II. To what group of animals does each of the following names refer?

1. Pride
2. Nide
3. Pod
4. Herd
5. Covey
6. Pack
7. School
8. Flock
9. Swarm
10. Bed

Answers on page 64

The Library

A thousand years wheel past me as a day.
I turn a page and history comes back
As vividly as when it went away.
Black magic this: the alphabet's thin track
Has carried on these fragile, narrow rails
The essence of man's life upon the earth:
His fine, heroic deeds; his fancy's tales;
His aspirations toward a richer worth.
I choose a volume, and a continent
Rewards my reach. I cross the seven seas
With strokes as swift and bold as my intent
To launch on any voyage that I please.
With time and space subdued to my command,
I conquest while I sit with book in hand.

Lewis C. Walker—
An Appreciation

When LaVerne W. Noyes, scholarly and far-seeing business man and philanthropist, passed away in 1919, leaving a fortune of several millions to the University of Chicago and other educational institutions, the Chicago Academy of Sciences lost a friend and patron who, as President of its Board of Trustees, had for years devoted time, money and painstaking care to the many needs of the Academy.

As the executor of his estate and as head of his large business enterprises Mr. Noyes designated Lewis Carter Walker, who during a quarter of a century in Mr. Noyes' service had advanced to become his chief lieutenant. The Board of Trustees of the Academy desired at the time to elect Mr. Walker as Mr. Noyes' successor as President, which honor he declined. Continuing however the duties which he had filled during Mr. Noyes' later years, Mr. Walker as a Trustee acted as the *de facto* President of the Board until in 1925 it insisted on his also assuming the title.

There was no one as well qualified for the office as he. For sixteen years he has since then added to his many burdens as the head of a large manufacturing enterprise the various problems, great and small, of the administration of the fiscal affairs of the Academy. Negotiations with the Chicago Park District, the investment of the Academy's endowment funds of nearly four hundred thousand dollars in securities and real estate, the care and improvement of the Academy building, the employment of a director or the discharge of a janitor, the calling and attendance at numerous committee meetings—these and a myriad of other duties have occupied the leisure hours of a gentleman who might well prefer a game of golf or reading the *Atlantic Monthly*.

At the annual meeting, just held, Mr. Walker insisted on retiring as President of the Board of Trustees, while remaining as a member of it. The meeting acceded to his request with great reluctance but with appreciation and gratitude for the outstanding services which he has rendered the Academy during two decades.

Until Mr. Walker's successor is selected, Vice-President Eugene H. Garnett will serve as acting President of the Board of Trustees. Dr. N. S. Davis, III, continues in office as President of the Academy.

Lewis Carter Walker, Canadian born, came to the United States as a young man and has been active in Chicago business and civic affairs for many years. His home is in Evanston where he is known for his youthful vigor, genial disposition and personal pulchritude.

Only those who have been associated with Mr. Walker on the Board of Trustees know how great a debt the Academy owes him.

—H. S. H.

MUSEUM  ACTIVITIES

Eighty-fourth Annual Meeting

The eighty-fourth annual meeting of the Chicago Academy of Sciences was held on Monday evening, April 14, 1941, in the Academy Auditorium. The program included the President's address of welcome, by Dr. Nathan Smith Davis, III; report of the Secretary, by Dr. V. O. Graham; report of the Treasurer, by Henry S. Henschen; and the report of the Director.

The following officers were elected: President, Dr. Nathan Smith Davis, III; First Vice-President, Tappan Gregory; Second Vice-President, Dr. V. O. Graham; Secretary, Alton S. Windsor; Trustee for six years, John Nash Ott, Jr.; Scientific Governors for three years, Dr. Hanford Tiffany and Dr. Charles A. Shull.

The speaker of the evening, Dr. A. C. Ivy, was elected to honorary membership in the Academy. Dr. Ivy is the Nathan Smith Davis Professor of Physiology and Pharmacology at the Northwestern University Medical School. He is president of the American Physiological Society, and of the American Gastroenterological Society and past chairman of the section on Physiology and Pathology of the American Medical Association. His address, entitled "The Gastrointestinal Hormones and Their Uses," summarized the results of twenty years' research on the problem and presented some of the practical applications that can be made of these results.

Entomological Society Visits the Illinois Natural Resources Building

On Sunday, April 27, twenty members of the Chicago Entomological Society, the Entomological Section of the Chicago Academy of Sciences, drove to Urbana to visit the new headquarters of the Illinois State Natural History Survey. Dr. T. H. Frison, Chief of the Survey, was host to the party and, with the help of members of his staff, conducted the group through the fine new building which is devoted to the study of the natural resources of the state. After Sunday dinner in the Illinois Student Union Building, the party visited the Entomology Building of the University where Professor W. P. Hayes showed some of the work being done and also the collections of the department. The rest of the afternoon was spent in the entomological laboratories of the Survey, examining the collections and "talking shop" with the staff entomologists.

Correction

In the last issue of the *Naturalist* it was erroneously stated that Tappan Gregory, Vice-President of the Academy, is chairman of the Committee on Credentials and Admissions of the American Bar Association. The statement should have been that he is a member of the Committee on Credentials and Admissions of the House of Delegates of the American Bar Association.

Dr. Gloyd on the Air

On April 23rd Dr. Gloyd was the guest educator for the Quiz Kids Program. This youthful quintet of experts has astounded the radio public with its remarkable knowledge in many fields of learning. All of the Quiz Kids are under 16 years of age and the special reason for Dr. Gloyd's presence was to honor the youngest of them all, Gerard Darrow. Gerard has an unusual knowledge of natural history, particularly the natural history of birds. Because of his remarkable accomplishments in the field of natural history he was honored by election to life membership in the Academy and on this occasion was presented with his certificate of membership.

Midwest Horticultural Society Meets at Academy

Mrs. Walter Brewster spoke on the "Flowers of Hawaii" at the April meeting of the Midwest Horticultural Society which was held in the Academy Auditorium on Friday evening, April 25. Mrs. William Beaudry, president of the Midwest Horticultural Society, presided and Mrs. Brewster, a well-known author and lecturer on flowers and gardens, described the flowers of Hawaii. Her lecture was illustrated by kodachrome pictures and her discussion of floral arrangements for the home was especially interesting.

On Thursday evening, March 27, 1941, Dr. Gloyd lectured on the animals of the Southwest before the members of the Chicago College Club. The lecture was illustrated with color motion pictures taken on the Offield-Beaty Arizona Expedition of the Chicago Academy of Sciences. Dr. and Mrs. Gloyd were guests of the Club at dinner preceding the lecture.

Mammals of Illinois

On May 15, number 3 of volume 6 of the *Bulletin of the Chicago Academy of Sciences* came off the press. It is entitled "Mammals of Illinois, an Annotated Check List with Keys and Bibliography" by W. L. Necker, formerly an Assistant Curator at the Academy, and Dr. D. M. Hatfield, Curator of Mammals. Comprising 43 pages, it includes a brief historical summary of the work which has been done on the mammals of Illinois, two keys, an annotated check list and bibliography. The first key, a general key to species found in the state, will aid in the identification of any mammal in this general area. In order to clarify difficult determinations, numerous figures are included. The second key, to skulls of genera, may be of assistance to anyone wishing to identify a skull picked up in the field. Accompanying the second key is a diagram of a mammalian skull with the more important diagnostic parts labeled. Also included are figures of skulls of six of the major groupings of mammals—marsupial, insectivore, bat, carnivore, rodent, and lagomorph. It is hoped that these will prove helpful in pointing out the principal skull characters separating these groups. A glossary completes the first section of the paper.

The annotated check list includes: scientific name; reference to the original description, and to a paper dealing with the natural history; and locality records for each species or subspecies. Locality records were drawn from 15 different collections, both public and private. There is a bibliography of 55 titles dealing primarily with mammals of the state.

Illinois State Academy Meets

The thirty-fourth annual meeting of the Illinois State Academy of Science was held May 2nd and 3rd at Northwestern University, Evanston, Illinois. Dr. Verne O. Graham, Vice-President of the Chicago Academy of Sciences,

was the retiring president of the Illinois Academy and he delivered the annual address on Friday morning, May 2nd, entitled "Fungi and Man." Dr. H. K. Gloyd took part in a symposium on "Animal Geography in Illinois" at the afternoon session of the zoology section of the Academy. Dr. T. H. Frison, Chief of the Illinois State Natural History Survey and an honorary member of the Chicago Academy of Sciences, was elected president of the Illinois Academy for the coming year.

Dr. Davis Heads Geographic Society

Dr. Nathan Smith Davis, III, President of the Chicago Academy of Sciences, was elected President of the Geographic Society of Chicago at the Annual meeting of the Society held on April 22nd.

Dr. H. K. Gloyd lectured on the reptiles of the desert at the Kansas City Museum on the evening of June 2. This lecture was presented under the auspices of the recently organized Missouri Herpetological Society of which Philip D. Evans, a life member of the Academy, is president. The following three days were spent by Mr. Evans and Dr. Gloyd visiting interesting localities in central Missouri for collecting reptiles and amphibians.

Dr. Gloyd attended the dedication ceremony of the Dyche Museum of Natural History of the University of Kansas at Lawrence which was reopened on June 6 after being closed to the public for eight years during which the building structure was strengthened and the principal exhibits remodeled. After brief visits with friends in Lawrence and Ottawa, Dr. and Mrs. Gloyd continued their journey to Arizona where they will carry on field work during the remainder of the month of June.

Academy Guests of W. G. N.

Over 600 members and friends of the Academy were guests of radio station W.G.N. in the large audience studio for the Chicagoland Hour, a musical program, on Saturday, March 22. During the broadcast Colonel Robert R. McCormick gave an address entitled. "The Developmental History of Radio," prepared by Dr. Henry C. Crew, life member of the Academy. (The text of the address appears in this issue of the *Naturalist,* pages 44-45.) After the broadcast the audience remained in the studio and heard brief addresses by Dr. Nathan Smith Davis, III, President of the Academy, and Lewis C. Walker, Chairman of the Board of Trustees. Dr. H. K. Gloyd presented color motion pictures taken on the Offield-Beaty Expedition.

Meeting of the American Association of Museums

Dr. E. C. Williams represented the Academy at the annual meeting of the American Association of Museums in Columbus, Ohio, May 15th and 16th. A large attendance from museums in all parts of the country made this meeting a very successful one.

These annual conclaves help museums to keep abreast of the times, and the sharing of ideas on the many problems of administration, education, exhibition, and preparation, has been one of the major factors in the development of the fine museums in this country.

Bird Walks Well Attended

The annual spring bird walks in Lincoln Park, sponsored by the Illinois Audubon Society, were held each Saturday from April 5th to May 24th. A large number of people took advantage of this opportunity to familiarize themselves with the migrating birds which pass through the city during this period. Miss Doris A. Plapp, secretary of the

Illinois Audubon Society, conducted all of the trips except that of May 14th when she attended the field meeting of the Illinois Audubon Society at Quincy, Illinois. On this occasion the group was led by Richard Edgren.

Lobby Exhibits

During the month of May an exhibit on the Chicago Subway was on display in the lobby of the Academy. Photographs taken in the tunnels during mining operations, some of the equipment used, and charts of the varying soil conditions with which the subway engineers had to cope, made up this interesting and timely exhibit. Dr. Ralph A. Peck, Assistant Subway Engineer, assembled the materials used and furnished the technical information necessary to make the exhibit possible.

The three types of mining used in the construction of the subway tunnels were each illustrated. The shield method, better known as the "biscuit cutter," which was used in some parts of the subway was illustrated by a series of photographs. There were photographs showing the process of hand mining, and one of the clay knives, with which the actual mining was done, was on exhibit. Open cut operations, where the first two methods were not practical, were shown by pictures. The work of soil exploration, a very important factor in the construction of the subway, was outlined in photographs; a number of charts prepared from the results of the test borings showed the types of soil conditions encountered in different sections of the subway. One of the sample tubes used in the test borings was shown.

Among the permanent exhibits in the Museum of Natural History of the Chicago Academy of Sciences there are several which are pertinent to the subway exhibit. Four relief maps of the Chicago Area indicate the changes which occurred here during the period following glaciation. The glacier which once covered most of this region was responsibile for the thick layer of clay through which the subway has been built. Waters flowing from the edge of the melting glacier into Lake Chicago, the forerunner of Lake Michigan, deposited this material which had been picked up in the course of the movement of the glacier from the north. The lower layers were dropped by the ice as it melted. A relief map of the bed rock underlying Chicago is another of the permanent exhibits in the Academy's Museum. This map is mounted in a table and covered with a glass upon which is a map of the city. This arrangement enables one to see just how far below the surface the bed rock commences in any given part of the city.

In connection with the annual meeting of the American Society of Mammalogists, held in Chicago the week of June 9th, a series of flashlight photographs of mammals, taken by Tappan Gregory, prominent Chicago lawyer and naturalist photographer, was placed in the lobby of the Academy. Mr. Gregory is Honorary Curator of Mammals at the Academy, and is the author of numerous scientific papers and of several books on natural history, the most recent of which is *Eyes in the Night.*

The exhibit, which will be on display for several weeks, includes photographs of deer, moose, wolf, coyote, beaver and other mammals, nearly all of which come out only at night and are rarely seen by man.

Mr. Gregory designed his own camera, a metal, weather-proof box to which is attached a flash gun, such as is used by press photographers. In use, the camera is set up with the lens and flash aimed at a trigger which is tripped by the mammal. In order to assure obtaining the desired picture, as many as a dozen cameras may be set up in runways or similar situations, where the animal might be expected to pass.

THE GARDEN CLINIC

By Laurence Blair

The Macmillan Co., 1940. xii, 146 pages, 40 of which are devoted to illustrative line drawings with captions. $2.00.

Plainly Mr. Blair is a gardener of superior background and ability, yet his book is remote from the encyclopedic dullness of yesteryear. Limiting himself to the requirements of space and readability, he is thorough without "talking down" to the reader. Forty pages of drawings with captions convey facts in a businesslike way. Here are visual aids at their adult best. Diagrammatic and not pictorial, points are skillfully emphasized without the loss of essential proportions. This is because they have been made by the author himself; a non-clinician could not have illustrated so well the pathological symptoms.

Because the patients range from Annuals to Flowering Trees in growth-form with collaterals of extremes of habitat and tolerance, any classification is difficult. The problem has been handled forthrightly in the Table of Contents and, for those who never look at the first section of a book, there is a concise Index.

This is a truly indigenous book, one that gives the gardening layman facts scientifically arrived at. These are not old wives' tales of customs that have been followed with success for years in famous gardens, rituals that have no demonstrable relation to the effects claimed for them.

It is possible to use the book as one would a dictionary but it is not probable that it will be used thus. Specific enemies of each plant are listed along with proper treatment. Because enemies and friends and garden devices run horizontally through the garden, they have not been segregated out but given space as the need arises instead. And so, if all the text in a category is not read, the drawings and captions will surely be scanned simply because much information is given rapidly and delightfully. Some one hundred decorative favorites are treated.

Cultural directions, varietal groupings, fungous and insect symptoms and causative agents, planting arrangements, propagation methods, specific fertilizer practices and degree of hardiness are treated with an interesting continuity that belies the dullness inherent in merely enumerating them.

The format and appearance of the book itself are as pleasant as the subject with which it deals.

—Anna Pedersen Kummer

INSECTS

By Harry Hoogstraal and photographs by Melvin Martinson.

Thomas Y. Crowell Company, New York, 1941, 144 pages, index. $2.00.

The physiognomy of insects, as shown by Mr. Martinson, may be quite as interesting and bizarre or commonplace as that of the giraffe, a bird-of-paradise, the dragon lizard, a mouse, or any of the vertebrates which are so interesting to most people. The small size of insects has prohibited all but the specialist from examining their detailed anatomy in the way that one could examine Su-lin or Mei-mei. Many youngsters begin their interest

in nature with a collection of insects, especially butterflies, but even they do not see the details which are so strikingly revealed by these photographs. For the beginner, for the one who has never liked insects because they were little crawling things, this book should at least remove the fear of indefiniteness due to their small size.

The information which Mr. Hoogstraal includes in the separate discussions of the forty-four insects in his book is well chosen and interest provoking. An adequate index will lead anyone to a discussion of any specific phase of life-history, anatomy, or behavior of the insects described in the book. A table of the characteristics of the orders of insects represented is helpful as an outline of their classification.

—Donald C. Lowrie

ABOUT SPIDERS.
Introducing Arachne

By Elaine V. Emans

E. P. Dutton & Company, Inc., New York, 1940, 183 pages. $2.50.

As a general, popular account of these much maligned creatures, this book is quite complete and well balanced. Miss Emans tries to overcome the antipathy for spiders which many people have; she shows that they help to control insect pests, and that they are not dangerous, as tradition would have us believe. The anatomy, physiology, behavior, and life history of spiders in general, as well as a few species in particular, are adequately discussed. The facts are well substantiated by library research and some personal observations, making inaccuracies negligible. The excellent photographs by Lee Passmore and O. C. Kuehn leave one wishing that many more had been included. This is a valuable book of information for one who is interested in spiders and their activities, however, the reviewer feels that occasionally there are too many anthropomorphisms, personal experiences and flights of imagination for a book which, by its material, would be more acceptable to those of high school age or older if the phraseology were not so juvenile.

—Donald C. Lowrie

WILDLIFE CONSERVATION

By Ira N. Gabrielson

Macmillan Company, New York, 1941, xv, 250 pages, 24 figs., 32 pls. Octavo. $3.50.

There has never been a time when we have needed more attention to conservation than right now. An "all-out" effort in any direction, and particularly in the direction of "defense" is sure to have a deleterious effect on all our natural resources and principally on wildlife. For this reason, it is good to see the advent of a book, written by the Director of the Fish and Wildlife Service, Washington, D. C., which presents the history, present status, and probable future of wildlife conservation in this country.

The moderate tone of the discussions on predator—prey relationships augurs well for the future policy of the Fish and Wildlife Service. By way of illustration, Dr. Gabrielson states, ". . . crows cannot possibly have the great adverse effect upon the continental duck population that is alleged." However, one cannot help but feel that the attitude taken toward the coyote and his relation to the stockmen of the West, is prejudiced in favor of the latter.

The numerous photographs are well chosen to illustrate the text. It might be wished that they were on white, rather than buff paper.

—Donald M. Hatfield

THE PHYSIOGRAPHIC PROVINCES OF NORTH AMERICA

By Wallace W. Atwood

Ginn and Company, New York, 1940, xvi, 516 pages, colored frontispiece, 281 illus. $4.80.

Vacation travels, this summer, for obvious reasons, apparently will be restricted to the continents of the New World. When vacations are over, retrospect, particularly on the part of some of the more serious-minded, is prone to be of a somewhat melancholy nature. Persons who are willing to spend money for the sake of relaxation and change sometimes accuse themselves of meager returns partly through the failure to enjoy to the utmost the changes of environment through lack of understanding the changing environment. Lack of the traveler's appreciation may be attributed to failure to know another tongue than the English, and failure to possess the historical and geographic background of places visited.

Concerning a geographic background, the Director of the Clark University Graduate School of Geography has eased the probabilities of a too painful post-vacation session in contemplation of what one has for the money he has spent. In a comprehensive volume of attractive typography, pleasing illustrations, instructive diagrams and luminous phrasing, Dr. Atwood has presented a scientific analysis of the contrasting physiographic regions of North America. In this manner the author has anticipated and answered the questions raised by the thoughtful observer touching the origin of the land forms he sees about him. And then, in answer to further questions which may come to mind, the author discusses the influences these environs have had upon the human activities within the given areas.

The units treated in the volume are those which naturally awaken the instinctive interest of the traveler. He may pass from the coastal regions to the fertile river valley, from plain to mountain, from lava plateau to scenic canyon. And just as he will note the contrast in these regions as he drives, so will he find them interpreted in North America from Florida to Alaska, from Acadia to Yucatan.

To give further inkling of what he may learn, reference is briefly made to a region already marked off on many a road map for this summer, and which is given a "sample" treatment in the volume—the Black Hills. As an index to what the discussions of the book cover, the author mentions the rocks of the Black Hills, their origin and attitude; the physiographic contrasts the Hills make with surrounding plains; the sculpturing of the rocks by running water, and the scenic effects wrought by the magic touch of their geologic agent; the response of vegetation to the rainfall of the region; and then, the culmination of all these environmental factors on the mining, forestry and other human activities within the region. Thus, somewhat after the pattern of the above treatment—goes the rest of the volume.

There are many other ways in which the merits of this volume might be outlined. It is designed primarily as a textbook. For the student, therefore, the comprehensive bibliography and the citation of topographic maps, which in themselves are an addition of no small value to the prospective vacationist, both add value to the general usefulness of the volume. In fact, it might very truthfully be said that the person who does not travel, but who stays at home and reads and studies the volume, that person possibly may enjoy the best and most inexpensive vacation.

—John R. Ball

SCIENCE ON PARADE

By A. Frederick Collins

D. Appleton-Century Company, New York, 1940. 301 pages, illust. $3.00.

Science on Parade consists of thumbnail sketches of the history and progress of eleven different fields of scientific endeavor. It covers fully the many new advances in synthetic products and is particularly interesting to the scientific hobbyist. Mr. Collins has written some ninety books on scientific subjects and is well able to make his explanations simple enough for the casual reader yet detailed enough to be of value to the student. He does this by the use of well chosen pictures and diagrams. The tremendous progress recently made in the fields of radio, aviation and photography, among others, is particularly interesting. The book is excellent as a reference for general science work in high school or in college and of great help to those who want to keep informed on the latest progress science has made in giving new and better things to the consumer.

—Helen LaBuy

BIRD ISLANDS DOWN EAST

By Helen Gere Cruickshank

Macmillan Company, New York, 1941, xii, 123 pages, 49 photographs, 6¾ x 8½. $2.50.

With a mature sense of the dramatic and at the same time a naively fresh approach to bird watching, Helen Cruickshank gives us here a book worthy of anyone's library. It is based on trips to various islands off the Maine coast in company with her husband, Allan Cruickshank. Sections on puffins, petrels, double-crested cormorants and arctic terns I found most interesting.

Of the photographs, one can only say that they are superb. As is true of most specialists in photography, Mr. Cruickshank does a somewhat better job on his specialty—birds—than he does on landscapes, at least so far as inclusions in this book are concerned.

Due to the apparent fact that the author is writing a text which will be understood not only by adults, but by teen age and younger children, one feels a certain lack of flexibility of style. However, the fence is so neatly straddled that this lack is usually not particularly noticeable.

—Donald M. Hatfield

ORNITHOLOGY LABORATORY NOTEBOOK

By Arthur A. Allen

Comstock Publishing Co., Inc., Ithaca, New York, 4th Edition, 1941. viii, 204 pages, numerous maps and figures. Paper, 8 x 10½. $3.00.

This new edition of Dr. Allen's well-known laboratory manual is particularly well-done; but the arrangement of material is obviously set up to follow Dr. Allen's plan of teaching. For this reason, one has the feeling that the chief value of the book lies in its acting as a supplement to the author's course in ornithology. However, the inclusion of such general materials as summer and winter ranges of North American birds and a zone map of North America makes the Notebook exceedingly valuable as a reference work.

Included are some excellent keys to orders, families and nests of birds, all profusely illustrated with drawings and photographs. Around 100 pages are taken up with blank maps and space for filling in life history data. Following page 204, there are 188 line drawings of birds, which one suspects are to be colored with crayon or water color.

—Donald M. Hatfield

THE NATURALISTS CALENDAR OF EVENTS

AMATEUR HERPETOLOGISTS' GROUP, H. K. Gloyd, Chicago Academy of Sciences, Diversey 5871. Meetings at Academy second Tuesday of each month, 8:00 P.M.

CHICAGO ACADEMY OF SCIENCES, Lincoln Park at Clark and Ogden Ave., Diversey 5871.

CHICAGO AQUARIUM SOCIETY, Mr. Harmon K. Greene, Secretary, Plaza 2088. Meetings third Wednesday of each month. 8:00 P.M.

CHICAGO CACTUS SOCIETY, Mr. Frank K. Balthis, President, Garfield Park Conservatory, Kedzie 1281. Meetings last Sunday each month, Garfield Park Conservatory, 3:00 P.M.

CHICAGO ENTOMOLOGICAL SOCIETY, Mr. Alex K. Wyatt, 5909 N. Virginia Ave., Ravenswood 3115.

CHICAGO ORNITHOLOGICAL SOCIETY, Mr. Rudyerd Boulton, President, Field Museum, Wabash 9410. Meetings third Tuesday each month. Eleanor Club, Stevens Bldg. 8:00 P.M.

FRIENDS OF OUR NATIVE LANDSCAPE, Miss R. B. Eskil, 6016 Ingleside Ave., Hyde Park 8313.

GEOGRAPHIC SOCIETY OF CHICAGO, 7 S. Dearborn St., Randolph 5293.

ILLINOIS AUDUBON SOCIETY, Chicago Academy of Sciences. Diversey 5871.

MARQUETTE GEOLOGISTS ASSOCIATION, Mr. George J. Huss, Secretary, Canal 1828. Meetings at Academy first Saturday of each month, 8:00 P.M.

MID-WEST HORTICULTURAL SOCIETY, Administration Building, Garfield Park, Van Buren 8100. Meetings last Friday each month.

PRAIRIE CLUB, 38 S. Dearborn St., Dearborn 3737.

STATE MICROSCOPICAL SOCIETY OF ILLINOIS, Chicago Academy of Sciences, Diversey 5871. Meetings at Academy third Friday of each month, 8:00 P.M.

WILD FLOWER PRESERVATION SOCIETY, Mrs. R. M. Strong, 5840 Stony Island Ave.

June 15 Prairie Club. Ravinia to Winnetka. Waukegan train of the North Shore Electric, 2:00 P.M.

June 16-21 The Friends of Our Native Landscape. The School for Nature Study. Starved Rock State Park, Utica, Illinois.

June 17 Biological Photographic Association. 185 N. Wabash, 23rd floor. Dinner 6:00 P.M.; meeting 7:30 P.M. Dr. De Lee's film, *The Science and Art of Obstetrics—Eclampsia.* Mr. Verne Blakely of the Chicago Film Laboratory will show the pictures. Guests are invited.

June 17 Chicago Ornithological Society. Stevens Bldg., 17 N. State Street. Dr. Harold O. Wiles and Mr. Rudyerd Boulton will speak.

June 18 Chicago Aquarium Society, Y. M. C. A. 8:00 P.M.

June 20 State Microscopical Society. 8:00 P.M. Academy.

June 20 Field Museum. H. N. Higinbotham Hall (Hall of Gems and Jewels) will be re-opened to the public.

June 21 Prairie Club. All day outing to Hazelhurst. Leave Plymouth Ct. below Jackson Blvd. 9:00 A.M.

June 26 Men's Garden Club of the Chicago Region. Brevoort Hotel, 12:00.

June 27 The Midwest Horticultural Society. Administration Bldg., Garfield Park. 8:00 P.M.

June 28 Prairie Club. Lyman Wild Life Sanctuary. Union Station. 2:08 P.M.

June 29 Prairie Club. Annual Rose Walk. 20 E. Randolph St., 3:00 P.M.

June 29 Chicago Cactus Society. Garfield Park Conservatory. 3:00 P.M.

July 4 Prairie Club. Independence Day Walk. 9:30 A.M.

July 5-6 American Delphinium Society. Garfield Park Conservatory. 8:00 A.M. to 10:00 P.M. Free to all.

July 8 Amateur Herpetologists Group. 8:00 P.M. Academy.

July 10 Men's Garden Club of the Chicago Region. Brevoort Hotel. 12:00.

July 10 Field Museum. Free motion pictures for children. 10:00 A.M.

July 13 State Microscopical Society of Illinois. Field trip.

July 14 The University Horticultural Society. Austin Town Hall. 8:00 P.M.

July 17 Field Museum. Free motion pictures for children. 10:00 A.M.

July 18 State Microscopical Society. Academy. 8:00 P.M.

July 24 Field Museum. Free motion pictures for children. 10:00 A.M.

July 24 Men's Garden Club of the Chicago Region. Brevoort Hotel. 12:00.

July 25 Midwest Horticultural Society. Administration Bldg., Garfield Park. 8:00 P.M.

July 27 Chicago Cactus Society. Garfield Park Conservatory. 3:00 P.M.

July 31 Field Museum. Free motion pictures for children. 10:00 A.M.

Aug. 7 Field Museum. Free motion pictures for children. 10:00 A.M.

Aug. 9-10 Midwest Gladiolus Society. Garfield Park Conservatory. 8:00 A.M.-10:00 P.M. Free.

Aug. 11 University Horticultural Society. Austin Town Hall. 8:00 P.M.

Aug. 12 Amateur Herpetologists Group. Academy. 8:00 P.M.

Aug. 14 Field Museum. Free motion pictures for children. 10:00 A.M.

Aug. 14 Men's Garden Club of the Chicago Region. Brevoort Hotel. 12:00.

Aug. 15 State Microscopical Society. Academy. 8:00 P.M.

Aug. 17 State Microscopical Society of Illinois. Field trip.

Aug. 28 Men's Garden Club of the Chicago Region. Brevoort Hotel. 12:00.

Aug. 29 Midwest Horticultural Society. Administration Bldg., Garfield Park. 8:00 P.M.

Aug. 31 Chicago Cactus Society. Garfield Park Conservatory. 3:00 P.M.

Sept. 1 Prairie Club. Labor Day at Lake Geneva. Northwestern Station, 8:45 A.M.

Sept. 6 Prairie Club. Tinley Park to Oak Forest. LaSalle Street Station via Rock Island R. R. 1:28 P.M.

Sept. 7 Prairie Club. Ainsworth, Indiana. Dearborn Station. 10:40 A.M.

Sept. 8 University Horticultural Society. Austin Town Hall. 8:00 P.M.

Sept. 9 Amateur Herpetologists Group. Academy. 8:00 P.M.

Sept. 11 Men's Garden Club of the Chicago Region. Brevoort Hotel. 12:00.

Sept. 19 State Microscopical Society. Academy. 8:00 P.M.

Sept. 25 Men's Garden Club of the Chicago Region. Brevoort Hotel, 12:00.

Sept. 26 Midwest Horticultural Society. Administration Bldg., Garfield Park. 8:00 P.M.

Sept. 28 Chicago Cactus Society. Garfield Park Conservatory. 3:00 P.M.

Test Your Nature Lore

Answers to questions on page .52

I.
1. nightingale: poetic
2. rooster
3. bear
4. hunter's name for grizzly bear
5. domestic cat
6. the family horse
7. fox
8. dog; specifically, a large dog
9. the Canada Jay
10. the pileated woodpecker—used by negroes

II.
1. lion or peafowl
2. pheasant young
3. whale
4. walrus, cattle, etc.
5. quail
6. wolves
7. fish
8. sheep
9. bees
10. oysters

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